

REMARKS

Entry of the foregoing and reconsideration of the subject application are respectfully requested in light of the amendments above and the comments which follow.

As correctly noted in the Office Action Summary, claims 1, 3-13, 20, 21 and 27-33 were pending. By the present response, claims 1 and 11 have been amended and claims 12, 20 and 33 canceled. Thus, upon entry of the present response, claims 1, 3-11, 12, 21 and 27-32 remain pending and await further consideration on the merits.

Support for the foregoing amendments can be found, for example, in at least the following locations in the original disclosure: the original claims, the drawing figures, and the specification, page 4, lines 20-27, page 5, lines 18-20 and 24-27 and page 6, lines 10-17.

CLAIM REJECTIONS UNDER 35 U.S.C. §112

Claims 11-12, 20 and 33 stand rejected under 35 U.S.C. §112, second paragraph on the grounds set forth in paragraph 2 of the Official Action.

By the present response, Applicant has canceled claims 12, 20 and 33 and amended claim 11 in a manner which addresses the above-noted rejection. Specifically, claim 11 now positively recites the NO_x adsorption catalyst as the structural feature that has certain recited properties within the claimed system. Reconsideration and withdrawal of the rejection is respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. §102

Claims 1, 5, 8-9, 27-28 and 30 stand rejected under 35 U.S.C. §102(b) as being clearly anticipated by WO 00/21647 (hereafter "WO '647") on the grounds set forth in paragraph 4 of the Official Action. For at least the reasons noted below, this rejection should be withdrawn.

To anticipate a claim, the reference must teach every element of the claim. See MPEP § 2131. For example, "a claim is anticipated only if each and every element as set forth in the claim is found, either expressly or inherently described, in a single prior art reference." Verdegaal Bros. v. Union Oil Co. of California, 814 F.2d 628, 631 (Fed. Cir. 1987). Here, the rejection is traversed because the cited reference does not teach every element of the claim. The following comments on the reference are offered.

Claim 1, the only independent claim at issue here, recites that a system for purifying a flow of exhaust gases of diesel or gasoline multicylinder engines consists of a combination of three operational units including a NO_x adsorption catalyst, an oxidation catalyst effective to promote oxidation of at least NO to NO₂; and a particle separator. In a flow direction of the exhaust gas, the NO_x adsorption catalyst is arranged before said oxidation catalyst or the NO_x adsorption catalyst is arranged in the same structure with the oxidation catalyst of the three operational units. The system reduces the amounts of hydrocarbons, carbon monoxide, nitrogen oxides and particles present in the exhaust gas.

WO '647 discloses a four unit combination comprising, in sequence, a 1st catalyst to oxidize NO to NO₂ (NO oxidation catalyst), a filter (PF) as a 2nd unit, a NO_x adsorber (NO_x trap) as a 3rd unit and a three-way catalyst (TWC) as a 4th unit.

Thus, comparing claim 1 to *WO '647* it can be seen that claim 1 recites a specific closed group of three operational units in the combination – namely, a NO_x adsorption catalyst, an oxidation catalyst effective to promote oxidation of at least NO to NO₂; and a particle separator. In contrast to claim 1, *WO '647* includes four operational units. Figure 1 illustrates these four units as oxidation catalyst 14, filter 16, NO_x absorber 28 and 3-way catalyst 30.

Furthermore, comparing claim 1 to *WO 647* it can be seen that claim 1 recites a specific arrangement of the some of the operational units – namely, the NO_x adsorption catalyst is arranged before said oxidation catalyst or the NO_x adsorption catalyst is arranged in the same structure with the oxidation catalyst. Thus in contrast to claim 1, *WO '647* arranges the operational units in a different sequence from claim 1. As seen in Figure 1, the units of *WO '647* arranged in the flow direction are oxidation catalyst 14, filter 16, NO_x absorber 28 and 3-way catalyst 30.

Applicant notes the following additional differences in the presently claimed system from claim 1. For example, the oxidation catalyst of claim 1 is of a specific type that oxidizes NO to NO₂. Thus, the oxidation catalyst of claim 1 works on the lean mixing ratio phase (see, page 4, lines 13-14, page 8, lines 4-5, and page 13, lines 24-30). In contrast to claim 1, *WO '647* reduces NO_x to N₂ and works during the regeneration phase.

For example, *WO '647* describes step iv of the catalyst system as “active at the prevailing temperature and not adversely affected by exposure to lean gas between regeneration periods. It may be associated with the absorbent or may, alternatively or additionally, be in a separate bed.” (page 4, lines 4-5 of *WO '647*). However, if the catalyst operates as claimed (see, claim 1, step b) where “at least

during said regeneration, subjecting the gas leaving the absorbent to a catalyst system effective to promote reactions of HC and CO with O₂ to H₂O and CO₂ and to react NO_x to N₂," then all these reactions must take place effectively in this catalyst. This means that a TWC or SCR catalyst must be used, which could be operated during the rich mixing ratio phase.

Further, from the above disclosure, it is respectfully asserted that the catalyst of WO '647 is a TWC or SCR catalyst. A skilled person would not have thought of an oxidation catalyst when considering a catalyst to reduce NO_x to N₂. It is a well known fact that a SCR catalyst oxidizes poorly CO and thus would be a bad choice for the catalyst of claim 1 in WO '647. All of the examples and definitions of WO '647 refer to the use of a TWC catalyst, which would be the natural choice in the WO '647 disclosure.

Applicant has also previously noted that in present claim 1, the oxidation catalyst is positioned after the NO_x adsorption catalyst or at the same structure and that the oxidation catalyst can additionally remove odorous H₂S. This is different from typical systems where the oxidation catalyst is preceding a filter or NO_x traps and soot/particle regeneration is based on NO₂ oxidation. In such typical systems, a separate oxidation catalyst before a NO_x trap enhances NO_x adsorption. In contrast, in the presently claimed system the operating principle is different as described at page 8, lines 4-5, and line 32 et seq. First, the presently claimed system does not have a separate oxidation catalyst before a NO_x trap. Rather, the NO_x adsorption catalyst can itself manage and adsorb NO_x as nitrates. In addition, the claimed sequence can also promote HC and CO removal in all operating conditions.

The above observations have been made to show that the sequence and the functional effect of the sequence on the purification by the system is quite difference between *WO '647* and claim 1.

Based on at least the above noted differences, it is respectfully asserted that an anticipatory rejection is improper because *WO '647* does not disclose all of the features of present claim 1. For at least this reason, the rejection should be withdrawn.

Claims 5, 8-9, 27-28 and 30 all depend from claim 1 and are thus distinguishable over and improperly rejected as anticipated over the disclosure in *WO '647* for at least the same reasons as discussed above. Withdrawal of the rejection of these claims is also respectfully requested.

CLAIM REJECTIONS UNDER 35 U.S.C. §103

Claims 3-4 and 29 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *WO '647* on the grounds set forth in paragraph 7 of the Official Action. For at least the reasons noted below, this rejection should be withdrawn.

Claims 3-4 and 29 all depend from claim 1 and are thus distinguishable over the disclosure in *WO '647*. In addition, the disclosure in *WO '647* does not disclose, teach or suggest the features of these claims. Withdrawal of the rejection of these claims is also respectfully requested.

Claims 6-7, 10, 13, 21, 31 and 32 stand rejected under 35 U.S.C. §103(a) as being unpatentable over *WO '647* in view of U.S. Patent No. 4,887,427 to Shinzawa et al. (hereafter "*Shinzawa et al.*") or DE 3,518,756 (hereafter "*DE '756*") on the grounds set forth in paragraph 8 of the Official Action. Claims 11-12, 20 and 33

stand rejected under 35 U.S.C. §103(a) as being unpatentable over *WO '647* in view of *Shinzawa et al.* or *DE '756* as applied to claim 10 above and further in view of EP 758,713 (hereafter "*EP '713*") on the grounds set forth in paragraph 9 of the Official Action. For at least the reasons noted below, these rejections should be withdrawn.

Each of claims 3, 4, 6-7, 10, 13, 21, 29, 31 and 32 depends from independent claim 1. The cited documents do not contribute to the overcoming the deficiencies noted with respect to the primary reference *WO '647* as discussed above for the 35 U.S.C. §102 rejection.

For example, the proposed combinations at least do not disclose, teach or suggest a specific closed group of three operational units in the combination – namely, a NO_x adsorption catalyst, an oxidation catalyst effective to promote oxidation of at least NO to NO₂; and a particle separator. In addition, the proposed combinations at least do not disclose, teach or suggest a specific arrangement of the some of the operational units – namely, the NO_x adsorption catalyst is arranged before said oxidation catalyst or the NO_x adsorption catalyst is arranged in the same structure with the oxidation catalyst.

More specifically, *Shinzawa et al.* discloses a catalyst equipped filter 50a-50d arranged in each of four branches of a manifold 12 and additional catalyst equipped filters 14 and 15 arranged in series in an exhaust gas passage downstream of the manifold 12 (see Fig. 4 and col. 12, lines 11-38). *Shinzawa et al.* does not disclose the claimed combination of three operational units nor does it disclose the claimed order of such units. Therefore, *Shinzawa et al.* does not contribute to overcome the above noted deficiency in *WO '647*, nor in combination with the other references does it contribute to establish prima facie obviousness.

Also, *DE* '756 discloses an exhaust pipe with a catalyser. However, such disclosure does not contribute to overcome the above-noted deficiencies in the other references with respect to the present claim 1.

In addition, *EP* '713 discloses, in order in the flow direction, an oxidizing catalyst 5, a filter 7 and a NOx absorbent 9 (See, for example, Fig. 1). *EP* '713 does not disclose the claimed combination of three operational units nor does it disclose the claimed order of such units. Therefore, *EP* '713 does not contribute to overcome the above noted deficiency in *WO* '647, nor in combination with the other references does it contribute to establish prima facie obviousness

Accordingly, for at least the same reasons as previously discussed, the cited disclosures, alone or in combination, do not establish prima facie obviousness and the rejection should be withdrawn.

CONCLUSION

From the foregoing, further and favorable action in the form of a Notice of Allowance is earnestly solicited. Should the Examiner feel that any issues remain, it is requested that the undersigned be contacted so that any such issues may be adequately addressed and prosecution of the instant application expedited.

Respectfully submitted,

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